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Paul F. Wille
6407 East Clinton St.
Scottsdale, AZ 85254

EXAMINER	
HAROON, ADEEL	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/645,360
Filing Date: August 21, 2003
Appellant(s): NOWLIN ET AL.

Robert Nowlin and Seth Suppapola
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/4/07 appealing from the Office action mailed 1/3/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,630,016	SWAMINATHAN ET AL.	5-1997
2003/0063662	UCHINO ET AL.	4-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swaminathan et al. (U.S. 5,630,016) in view of Uchino et al (U.S. 2003/006362).

With respect to claim 1, Swaminathan et al. disclose a method of providing a comfort noise signal in a digital telephone having a receive channel and transmit

channel in order "to provide background noise for discontinuous transmission and receiving systems during periods of voice inactivity that has the attributes of background noise during periods of voice activity" (Column 1, lines 14-19 and Column 2, lines 14-19). Swaminathan et al. do not disclose using sub-band filters and apply noise in accordance with magnitude of the signal in the sub-band. However, Uchino et al. disclose a method for providing a noise signal in a digital communication system. Uchino et al. discloses generating a white noise signal (Paragraph 114). Uchino et al. also disclose applying the white noise to a QMF filter bank, element number 56, to produce a comfort noise signal (Paragraph 472), wherein the magnitude of the white noise into each QMF filter is controlled in accordance with the magnitude of the signal in a corresponding sub-band in the one channel (Paragraph 457). Uchino et al. further disclose selectively coupling the comfort noise to the channel (Paragraphs 115-147). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to apply Uchino et al.'s method of generating noise in the telephone of Swaminathan et al. in order to generate a noise signal that fluctuates along the power spectrum density distribution characteristic of the frequency fluctuations of the receive or transmit channel (Paragraph 478).

With respect to claim 2, Uchino et al. also disclose coupling a white noise signal through a first and second multipliers, element number 55, to the low pass and high pass input of a QMF bank respectively in figures 23 and 24 (Paragraphs 456-457, 472). Uchino et al. further disclose controlling the gain of the multipliers, element number 54,

with the magnitude of the sub-band analysis where the first sub-band has a lower frequency than the second sub-band (Paragraphs 456-457).

With respect to claim 3, Uchino et al. do not expressly disclose combining the output signals from two or more of the sub-band filters. However, this combination results only in a wider bandwidth sub-band filter, which controls the multiplier's magnitude. Since Uchino et al. teach that the bandwidth of the sub-band filters as a range (Paragraph 442), it would be obvious to one of ordinary skill in the art at the time of the applicant's invention, to combine the outputs of the sub-band filters resulting in a wider bandwidth sub-band filter in order to have a wider bandwidth for the sub-band filter.

With respect to claims 4 and 5, Uchino et al. further disclose n sub-bands with no more than (n-1) QMF banks, element number 57, that are upwardly cascaded to increase the low frequency resolution of the comfort noise in figure 27 (Paragraph 472).

With respect to claim 6, Swaminathan et al. disclose a cellular telephone having an antenna, an RF stage, and signal processing circuit having an audio processor having a receive and transmit channel in figures 1 and 2. Swaminathan et al. further disclose a comfort noise generator, element number 76 (Column 4, lines 57-59). Swaminathan et al. do not disclose using sub-band filters and applying noise in accordance with magnitude of the signal in the sub-band. However, Uchino et al. disclose a digital communication system method, which has noise generating means. Uchino et al. discloses a device having a receive channel and a transmit channel in figure 1. Uchino et al. disclose a plurality of analysis sub-band filters band (Paragraph

452). Uchino et al. disclose a comfort noise generator including a white noise generator, element number 25 (Paragraph 114). Uchino et al. also disclose coupling the white noise signal through a first and second multipliers, element number 55, to the low pass and high pass input of a QMF bank respectively in figures 23 and 24 (Paragraphs 456-457, 472). Uchino et al. further disclose controlling the gain of the multipliers, element number 54, with the magnitude of the sub-band analysis (Paragraphs 456-457). Uchino et al. further disclose means for selectively coupling the comfort noise to the channel (Paragraphs 115-147). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to apply Uchino et al.'s method of generating noise in the telephone of Swaminathan et al. in order to generate a noise signal that fluctuates along the power spectrum density distribution characteristic of the frequency fluctuations of the receive or transmit channel (Paragraph 478).

With respect to claim 7, Uchino et al. further disclose n sub-bands with no more than (n-1) QMF banks, element number 57, that are upwardly cascaded in figure 27 (Paragraph 472).

With respect to claim 8, Uchino et al. do not expressly disclose combining the output signals from two or more of the sub-band filters. However, this combination results only in a wider bandwidth sub-band filter, which controls the multiplier's magnitude. Since Uchino et al. teach that the bandwidth of the sub-band filters as a range (Paragraph 442), it would be obvious to one of ordinary skill in the art at the time of the applicant's invention, to combine the outputs of the sub-band filters resulting in a

wider bandwidth sub-band filter in order to have a wider bandwidth for the sub-band filter.

With respect to claim 9, Uchino et al. further disclose n sub-bands with no more than (n-1) QMF banks, element number 57, that are upwardly cascaded in figure 27 (Paragraph 472).

With respect to claim 10, Uchino et al. do not expressly disclose the number of the QMF banks is (n/2 –1). However, since the summation of the sub-bands filters only resulted in a wider sub-band filter, the combination is treated as one sub-band filter. Therefore, the expression (n/2-1) is interpreted as one less QMF bank than the number of sub-band filter, which Uchino et al. teaches in figure 27 (Paragraph 472).

(10) Response to Argument

Appellant's arguments have been fully considered and are deemed not persuasive for the following reasons.

The appellant argues that the combination of Swaminathan et al. and Uchino et al. is inoperative. The examiner respectfully disagrees. The Swaminathan et al. reference was used to teach the concept of comfort noise generation for a wireless telephone (Abstract), and the Uchino et al. reference was used to teach a method of generating noise in accordance with the magnitude of a signal (Paragraph 457). With both teachings in mind, it would be obvious to one of ordinary skill in the art to apply the teaching of generating noise as taught by Uchino et al. in the telephone of Swaminathan et al. since it already has a comfort noise generating means in order to generate noise

signal "having a characteristic along the power spectrum density distributions of the frequency fluctuations" (Uchino et al.: Paragraph 478). In other words, one would be motivated to incorporate Uchino et al.'s teaching in order to generate a noise signal that corresponds to the magnitudes of the different frequency sub-bands thus resulting in a more consistent result when coupled to the transmit or receive channel.

The appellant also argues that Uchino et al.'s system cannot be characterized as a digital communication system and is merely a wire. The examiner respectfully disagrees with this interpretation. As can be seen by figure 1, Uchino et al. disclose a transmission unit, 40, and reception unit, 41, over a digital line, 1, which constitutes a digital communication system. Figure 5 shows the noise signal from noise generating means 25 being coupled to the transmission channel with adder 29 since the signal is being sent to the transmission unit 40. Figure 5 further shows the processing of the signal occurs when the signal is in digital form and then is converted to analog with the digital-to-analog converter, 30d. The wire that the appellant refers to is the carrier medium to which the signal is applied. Therefore, Uchino et al. clearly disclose a method of providing noise signal in a digital communication system. What exactly the line is comprised of is not relevant since the line being a wireless line for a cellular telephone was already established by the Swaminathan et al. reference in the rejection.

The appellant further argues that Uchino et al. do not disclose "the magnitudes of the white noise into each QMF filter is controlled in accordance with the magnitude of the signal in the corresponding sub-band in the one channel". The examiner respectfully disagrees. Paragraph 457 of Uchino et al. clearly disclose this limitation.

Paragraph 457 states that "The weighting coefficients σ1 – σ13 have values proportional to the square roots of magnitudes of spectra in the respective bands of the power spectrum density distribution". This proportionality relationship is interpreted as equivalent to the cited limitation since the weighting coefficients are set in accordance to the magnitude of the spectra/sub-bands. The appellants also cite paragraphs 458-470 that the weights are fixed and not variable and according to the magnitudes of the signal. However, those paragraphs are related to figure 24, which shows how these weights were determined. The weights were determined by assessing the magnitudes of the signals in sub-bands and then one sub-band's weight is designated a reference value and the rest of the sub-band's weights have corresponding values in relation to reference value (Paragraph 458). Uchino et al. further teach this relationship by stating "Subsequently, in a similar manner, as a result of combining noise signals weighted at respective rates, the sub-band combiner 57 generates a fluctuating signal sequence y(k) having a characteristic along the power spectrum density distribution characteristic Sy(f) of the frequency fluctuations" (Paragraph 478). The fluctuating signal is evidence of variable weights and not constant weights as the appellant argues.

It is believed that the combination of Swaminathan et al. and Uchino et al. disclose all claim limitations; therefore, all rejections in this case are proper.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Adeel Haroon

AD: 2618

8/30/07

Conferees:

Edward Urban

SPE Art Division 2618

EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Mathew Anderson

SPE Art Division 2618

MATTHEW ANDERSON
SUPERVISORY PATENT EXAMINER